MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

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QUARTERLY MEETING.

WALTHAM, April 27, 1892.

The meeting was called to order by the President, who announced that the first business in order was the election of a secretary pro tem.

Dr. Abbott was chosen to act as secretary pro tem.

The PRESIDENT. The association is fortunate in having with it to-day Mayor Mayberry of Waltham. His presence with us to-day gives us great satisfaction and we would be glad to hear from His Honor.

HON. GEORGE L. MAYBERRY. *Gentlemen of the Association:* The greeting to-day properly comes from me, not from you, and in behalf of the city of Waltham I will say that I am more than pleased to be able to welcome the association here. Our local board of health is a body in which the city takes great pride, and the steady advance that they are making in keeping the city up to the requirements of the most improved methods of sanitary science is most acceptable to us, except when we come to the matter of expense, and in that we have found it necessary to tone down their ideas considerably. I have no doubt it is the same elsewhere. In fact, some of us have felt alarm at the manner in which their powers are extended more and more each year by the legislature as the legislature tries to keep pace

with scientific discoveries. About a year ago we came in contact here with the president of your association. We started in, in all innocence, to extend our water works system, — to build a larger well in order to get a larger supply, and inasmuch as we had always had a water supply here which we prided ourselves was one of the very best in the State, and inasmuch as the water had been analyzed for a series of years by the State Board of Health, in full innocence we went on and filed our petition in the State House for leave to extend the supply by enlarging the same well and getting a larger supply from the same source. In doing so, we ran across the State Board of Health. They did not propose to be ignored in the matter, and they compelled us to go through the routine of filing our plans before they would grant their permission, which they finally gave, and were no doubt intending to give at the outset. However, the association is doing a good work, and if occasionally the rest of us who are not within the inner sanitary circle kick, you must expect that; for it takes us some time to grow up to the elevated state of mind which you get in a meeting like this. We were almost astounded a year ago when our board of health told us that if we did not water our streets we would have something here before a great while which we didn't want, — nothing short of cholera or scarlet fever or something of that kind, — and of course we immediately complied with their demand. After all, we find it is an advantage in a community like ours, rapidly growing, to have a body of men who thoroughly appreciate the needs of a growing community, and who keep us up to the standard necessary in a city of this kind; and although we do not follow them as rapidly as we ought, yet we are in sympathy with them and keep up with them as well as we, with less speed and more halting step, are able to do. The work, of course, that an association of this kind can do is important, and I have no doubt that in each of your communities the power that you have has been used for the general good, and that the proper treatment of these questions of health has been, as it has been here, a great blessing to other cities; and although we do not always, as I say, follow implicitly every suggestion that is made, it is with an appreciation of the work of an association like this, and with a feeling

of interest in the objects of the association, that I take great pleasure on behalf of the city in welcoming you to Waltham.

The PRESIDENT. Is there any business to be presented on behalf of the executive committee, Dr. Durgin?

DR. DURGIN. There were proposed for membership Dr. Alexander Burr and Hon. E. J. Donovan, of Boston. The executive committee recommends the election of these gentlemen. Also, the printing committee asked the endorsement by the association of the making of a new contract for printing the doings of the association. These two items are recommended by the executive committee.

Dr. Alexander Burr and Hon. E. J. Donovan were duly elected members of the association.

It was voted that the printing committee have authority to make such contract as seems best to them for the printing of the proceedings of the association.

The PRESIDENT. The first business of the meeting will be the reading of a paper by Mr. James C. Coffey, of Worcester, on " A Local Epidemic of Diphtheria."

MR. JAMES C. COFFEY, Clerk of the Worcester Board of Health, said, —

Gentlemen: — For the benefit of the members I desire to say that at Worcester during the early winter we had in a school district there an epidemic of diphtheria which resulted in sixteen deaths out of some forty odd cases, and it created considerable excitement and ended by the Board of Health recommending the closing of a twelve-room school building, which is located here, on this plan which was drawn by an engineer in our office, between Home and Dix Streets. In answer to an order of the city council the Board of Health made a report, giving the history of the epidemic, with the facts that came to their knowledge in investigating the case. I wrote the report for the city council, and without my knowledge Dr. Woodward put me down to read the report at this meeting, and I did not know until Saturday that that was expected of me, but I had this map drawn yesterday by an engineer in our department, and I can say that it is a correct representation of that section of the city.

In this district the highest elevation is 578 feet above tide water, and the lowest elevation is 494 feet, a difference of 84 feet in about 1,300 feet, or a quarter of a mile, in round numbers, in a direct line. This portion is a hillside, which is wet and clayey, sloping to the north and west, and exposed here to the northeast winds coming across here and across this lowest part of the district. Here this district is thoroughly sewered, but on Pink Street, at this lowest point, the sewer is pretty near the surface, so much so that in one house where the water-closets are located in the cellar the sewage at times has backed up through the closets and flowed into the cellar.

Here on the eastern border of the district are some of the very best houses in Worcester, — along through Harvard Street live some of the very best people of the city, business men, and the very best class of mechanics, while down here through this portion are located the laboring classes. The houses in here are old, and have probably been standing longer than in any other portion of this district. In here are some colored people, — quite a settlement. On this street here again begins a better and a more comfortable class of dwellings than in through here.

The first case of diphtheria that occurred in that district was on Denny Street here. There was a great deal of discussion in Worcester as to whether the epidemic was caused by the defective conditions existing in this schoolhouse, or whether the sanitary condition of the house and the people who lived there were responsible for it. This first case was that of a married woman, 28 years of age, and it was reported on May 20th of last year. Case No. 2 was reported from Bowdoin Street in June, and as you can see was in no way connected with case No. 1, in this locality. This was the case of a child 8 years of age, and it resulted in death. Case No. 3 was reported from the same street, Bowdoin Street, June 16th, ten days after case No. 2, and was that of a child of school age, a girl 7 years old, who recovered. This was the last case before school closed for the summer vacation. During the summer vacation seven cases were reported, resulting in three deaths. The first of these cases was reported fifteen days after the closing of the school; and twenty-five days after case No. 3, case No. 4 was

reported, — that of a girl 6 years old, on Dix Street, in a different section of the district. Cases Nos. 5, 6, and 7 were reported from Pink Street. July 25 and August 6, and cases 8 and 9 were reported from Lily Street. Those are both short streets and practically the same class of people live there and have more or less intercourse with each other.

Cases 6 and 7, 8 and 9, and case 10, reported from Pink Street and Lily Street, were in the immediate vicinity of case 5, and investigation showed that these children had been playing together in the street. Case No. 11 was reported from Harvard Place on the 8th of September, the first case after the opening of the school after the summer vacation, on the very day the school opened, in fact, and twelve days after the report of case No. 10 from an entirely different section. As I told you before, the people in this locality have very little to do with these people down here in the neighborhood of Pink Street. It is a different section and a different class of people. Case No. 12 was reported from Pink Street twelve days after case No. 11, and was in the immediate vicinity of cases 5, 6, 7, 8, 9, and 10. This child had never attended school, and was a Swede child that had been in this country only two weeks.

Case No. 13 was reported Sept. 23d from Wachusett Street, three days after case No. 12, and from a different section. This was the first case reported after the summer vacation of a child attending school. October 12th the 14th case was reported from Dix Street, and was that of a boy attending the Dix Street school. Case No. 15 was of a child too young to attend school, but a member of the same family as case No. 14. Case No. 16 was reported 13 days after case No. 15, with which it could have had no connection, case No. 15 being that of a child too young to attend school. This child was a child of school age and recovered.

The length of time which elapsed between cases 16 and 17 affords no ground for connecting these cases together. Case No. 17 was reported November 20th from Denny Street, seven days later than the last previous case. There might possibly have been a connection between these two, as they lived in the same vicinity, but the sanitary condition of the houses in which both these cases occurred was bad.

Case No. 18 was reported from John Street Avenue, December 11th, 21 days after case No. 17. It appeared upon investigation that this child was in school with sore throat several days before she came down with diphtheria. If you will bear that case in mind you will see that in this report it has a certain significance. The plumbing and drainage system of the house in which this child lived was very bad.

Case No. 19 was reported from William Street, December 19th, eight days later. The plumbing and drainage system of this house was bad. Case No. 20 was reported from Home Street, December 25th. This child was not of school age and was from a family having no other children in school. The sanitary condition of the house was fair. Case No. 21 was reported December 30th, five days after case No. 20, and eleven days after case No. 19, the last case of school age which preceded it; and it resulted in death. The plumbing and drainage system of this house was very defective.

Cases 22 and 23 were reported together from a family on John Street, January 2d, three days after case No. 21. One of these was a boy of six years and the other a boy of one and a half years; the eldest died. He was of school age and had been in attendance at this Dix Street school. The plumbing and drainage system of this house was defective.

Case No. 24 was reported from William Street, January 4th, two days later, and was that of a child of school age. Case No. 25 was in Pink Street in the same vicinity as cases 6, 7, 8, 9, 10, and 12. This child was not in attendance in the Dix Street school. It was an attendant of a parochial school in another part of the city. Case No. 26 was reported from Wachusett Street, another section of the district, on the same day as case No. 25; and cases 27 and 28 were two children of different families, both attendants at the Dix Street school. One of these resided on Goulding Street and the other on Dix Street. They are very close together, as you will see by looking at the plan. This family had two cases, and both children died, one a boy of fourteen years, and the other a girl of six.

Case No. 31 was reported from North Ashland Street, January 18th, —a different section of the district, as you see. This child was not of school age. This case was followed January

23d by three cases, West Street, Lancaster Street, and Dix Street, all of whom attended the Dix Street school. In this Lancaster Street house there were in all three cases, — two children, who recovered, and after their recovery, the mother, worn out with nursing and anxiety, contracted the disease and died.

Case No. 35 was reported from North Ashland Street, January 25th. That was the second case in that same house, although in a different family. These were colored people, and the day our inspector called there to placard the house, he found the child dead and the room filled with people, other children, and adults. He ordered them out. Subsequently another child, in another family in the same house, came down with the disease. That was January 29th. On that day the Board voted to recommend closing the school.

It will be seen that from December 11th to the closing of the school, a period of about six weeks, 21 first cases in families occurred. In these are included three cases who were ailing at the time of the closing, but were not reported for a day or two thereafter.

Since the closing of the school, an equal period of time, but three cases have been reported; two of these were children in the same family, one two years and the other six months of age, both, of course, too young to attend school. The third case was that of a young lady 21 years old.

This school had the Smeed System of dry closets and ventilation. It was put in some five or six years ago and was one of the earliest school buildings in the city to be supplied with that system. It was an old, twelve-room brick building, and it was adapted as well as it could be to the new conditions. In this system as originally applied the air is taken from the outside, carried in and warmed over a heating surface, and through flues forced into the room at about midway of the walls. The foul air is taken from the base of the rooms along by the mopboards and drawn down into a central chamber in the basement. It is taken by means of a heated flue across the vaults, where the excrement drops on to the wire screens, and passes up through the building. The idea was to dry the excrement by this foul air sucked out of the rooms, and also dry the urine in

the same way, but as a matter of precaution there was a connection with the sewer on both sides of the building, on the girls' side and on the boys' side, for use in case the air did not thoroughly dry the liquid matter.

Now, we found on investigation that there was a day during the fall that the fires were allowed to get down so low, and the atmospheric conditions outside being suitable, the foul air instead of going out and up through the building was forced back over the vaults and up through the foul air ducts into the rooms occupied by the children, driving them out on the lower floor of the building. I found that out on investigation, by making inquiries, and the thought naturally presented itself to me, if that were true in the autumn would it not be necessarily true at night, when there was nobody in the building, and the fires would perhaps become low and the atmospheric conditions suitable to beat it down? I found that during the summer vacation when the school was not occupied and the fires were all out, that that odor from the vaults was very strong in those rooms; and consequently we recommended the entire cutting off of the rooms from any connection with the vault system, and that foul air be carried into particular places constructed for the purpose and carried out without carrying it over the fecal matter in the vaults. We also recommended that in the vault be constructed a latrine. All our recommendations were carried out.

Under the direction of the local board the building was thoroughly fumigated. We sent three men over and made the building as air tight as possible; we covered the ventilators on the roof and made them as tight as possible, and then with cotton batting three men spent two days in the building, making it as thoroughly tight as it could be made, after which we burned some 700 pounds of sulphur in the different rooms. We put it into the basement, in the ventilating shaft, where the cold air was taken in, and then up in the lower rooms. All of the floors were washed with a solution of corrosive sublimate, and the walls were scraped and repainted and the desks revarnished. There were two of the rooms where children of the first grade were in attendance in which the majority of cases occurred that were directly over these vaults. There were ten

cases in one room, and six in another, directly over the vaults. The desks in those rooms were all taken out and new ones substituted therefor, and the books in those rooms were all burned.

Of course, as you are aware, under the free text-book act the books are owned by the city and are used by the children in common. Those books we recommended burning and that was done.

Now, this system of dry closets was the system as originally put in. This company does not at present put in the system in that way; that is, in this part of the country, they do not have any connection between the vaults and the room. The system is controlled by a number of different firms who have bought patent rights for different sections of territory, but I am informed by the district police that there are none of these put in in that way now, where the vaults and rooms are connected, that they are now entirely separate.

I do not know that I can add anything further to this except that as I said, this is a wet, clayey soil, and that here is a place that water stands. I have frequently seen water standing there an inch to an inch and a half in depth on that field, and it is a common occurrence in the evening after rains to see fog rising in through here. This is the lowest point; to the northeast there is no elevation, on the west is the hill on which the Technical Institute is located; so that in here is a valley with a northeastern exposure, and there is no shelter at all for that section.

Since the school has re-opened we have had in the district some five cases. Three of them were down here in this section of children too young to attend school, babies, in fact, from one and a half to three years old, and up in here we have had two cases reported, a mother and daughter, the latter a child of school age, who did not attend this school, and from whom the mother contracted the disease.

That district for the first time in many months is entirely free from the disease, or at least there is but one case and that case is convalescing. In all, counting the cases since school re-opened, we have had 51 cases in that district, with 18 deaths, about thirty-three and one third per cent being fatal.

The PRESIDENT. Several gentlemen have agreed to say something in connection with this topic, and I am going to call upon Dr. W. H. Prescott.

Remarks of W. H. Prescott.

Mr. Chairman and Gentlemen: — When Dr. Durgin asked me to come out and speak he thought the question of the differential diagnosis of diphtheria would be the one that would occupy your attention most, and that was the subject upon which he wished me to speak.

It is surely one of the most uncomfortable things a man has to do to make a diagnosis of a contagious disease, especially if he is not sure of it. It entails a good deal of expense upon the patient's family and upon himself, and unless you are sure of your diagnosis it is pretty hard to say that you think it is diphtheria.

I think most physicians feel the only disease with which diphtheria is liable to be confounded, — non-contagious disease, I mean, — is tonsilitis, especially in those cases where the soft pultaceous masses and particles run together, making a large mass, perhaps the size of your finger-nail, on the tonsils there being a good deal of constitutional disturbance. In such cases as that the points to which a physician would naturally look for the purpose of making a differential diagnosis are the enlargement of the glands about the angle of the jaw, the ease with which he can remove the mass if it be tonsilitis, the difficulty if it be diphtheria, and the tendency to spread if they are let; but they are very difficult cases at times. If the case clears up in twenty-four hours, as it very often does, the diagnosis is clear, but often one has to keep from making a diagnosis for that length of time and sometimes longer.

But there are other cases that may be mistaken for diphtheria.

The most common one, I think, is syphilis, and very often the diagnosis of diphtheria has been made when it really was syphilis. The differential diagnosis between the two is very difficult and sometimes impossible without the element of time. The diagnosis of syphilis is seldom at any rate made in the case of a young child. It is more apt to occur in the acquired form and in an adult. Therefore the matter of age is the principal differential diagnosis at first. Then the fact that it is more common that the trouble is one-sided in syphilis and spread rapidly in

diphtheria is another element. But sometimes it is absolutely necessary that no diagnosis shall be made for twenty-four to forty-eight hours. Another disease with which diphtheria is sometimes confounded is herpes of the pharynx, which is a very rare disease, but which does occur, and two cases of which I have seen. Both cases were diagnosed and sent to the City Hospital, where I was then, as diphtheria. I do not know why, but for some reason I do not think it was diphtheria; there was something about it that did not look exactly like diphtheria, and I refused to put it in the diphtheria ward. It was such a suspicious case that it was taken into the hospital and put into a room by itself in our isolating ward, and quite a number of the men on the staff saw it, and there was no doubt that it was a case, — that both of them, for the same history applies to both, — that both of them were cases of herpes and not diphtheria, and the differential points were that the masses, which looked something like membrane, could be scraped away leaving instead of a fresh, bleeding surface, an old surface, — ulceration, — which looked like one of the indolent ulcers which are sometimes seen on the outside of the lip. And then, they never come together, they never spread at all, their edges are slightly raised, but not reddened in the way that appears when you have a diphtheritic patch.

Another disease that is sometimes mistaken for diphtheria is cancer of the tonsil, which I have seen mistaken twice, and where the death of the patient, months afterwards, from the disease, proved the correctness of the diagnosis. In that case the diagnosis was made on the follicular character of the disease, the fact that the tonsil was spongy; it was clotted and more spongy than it is in diphtheria, and the slough went deeper than as a rule it does in diphtheria; but, after all has been said about the diagnosis and the diseases that can be mistaken for diphtheria, the fact remains that it is often very difficult, impossible, I think, to make an absolute diagnosis between diphtheria and some of the diseases with which it is often confounded.

Then the differential diagnosis between diphtheria and what is called membranous croup has often come up and has caused a great deal of trouble. In the last number, or one of the last numbers, of the *Lancet*, Dr. Martin reported six cases of diph-

theria in which he had done tracheotomy. In one of them there had never been the least sign of any membrane in the throat or anywhere else, although there had been laryngoscopic examinations and microscopic. The child finally died after laryngotomy, from diphtheria. The doctor examined carefully the lungs, the throat, the trachea, and no membrane could be seen. He then examined it with the microscope, and numerous flakes of membrane were seen just above the vocal cords, I forget just where, and in that membrane were Klebssobacill, making the diagnosis absolutely sure. In another case that I remember that was sent to the hospital by two physicians who were experts in this branch, they were sent in as a case of laryngeal obstruction for operation. There was only one place to put it for operation, and that was in the diphtheria ward. The tube was inserted but did not bring relief. The trouble increased, making the diagnosis of diphtheria absolutely sure, although there was nothing in the throat or in the larynx or any part visible to the laryngoscope.

So it seems to me that all cases of suspected diphtheria should be considered diphtheria until the element of time has come in to make the diagnosis sure.

Dr. Durgin. I would like to ask Dr. Prescott as to his idea of attempting a differential diagnosis between diphtheria and the so-called membranous croup, — if he recognizes a difference which is capable of demonstration in any way?

Dr. Prescott. I do not believe there is any difference at all. I believe that every case of membranous croup is diphtheria, and the reason there are so many cases put down as membranous croup is because the membrane cannot be seen; but in the case I referred to that was reported by Dr. Martin in London you could not see any membrane at all, but it was diphtheria without any question. It does not seem to me there can be any such thing as membranous croup without being diphtheria. There is croup without any diphtheria, but no membranous croup.

The Chairman. I will now call on Dr. McCollom.

Remarks of Dr. J. H. McCollom.

Mr. President and Gentlemen: — I have been very much interested in the paper of Mr. Coffey, and also in the remarks

of Dr. Prescott. I think that the danger of contagion from mild cases of diphtheria is not fully appreciated by the public at large. Children, who have these slight attacks, attend school during the whole course of the illness and thus become potent factors in causing the spread of the disease. A short time ago I made an analysis of some 11,000 cases of diphtheria that occurred in Boston during a period of five years, and it was very interesting to note the marked diminution in the number of reported cases in vacation time as compared with those reported during term time.

Diphtheria of the lungs, which is frequently mistaken for croupous pneumonia, is another source of contagion which has not received proper attention. Some three or four years ago Dr. Thayer, of Brooklyn, N. Y., published a very instructive pamphlet on the relation of pneumonia to diphtheria, in which he showed conclusively that many cases of supposed croupous pneumonia were in reality cases of diphtheria of the lungs. Of course, during life, it is impossible to diagnose these cases with any degree of accuracy; but the fact of their existence may often explain an outbreak of diphtheria in a given locality.

Domestic animals, particularly cats, are frequently a source of contagion.

In the *Sanitarian* of August, 1891, is a valuable paper by Dr. E. Klein, of London, entitled "A Contribution to the Etiology of Diphtheria," in which the author cites several instances where cases of diphtheria in children were directly traced to the disease in cats. It is important to observe, as bearing on the subject of diphtheria in the cat, that in this animal the disease in its symptoms and pathology is a lung disease, and for this reason has been overlooked by many observers. Cows may have diphtheria, and when ill with this disease may communicate it through the milk. The conditions of cows ill with diphtheria, as described by Dr. Klein in the article just mentioned, is as follows: —

"Two milch cows were inoculated with a broth culture of the diphtheria bacillus derived from human diphtheria. In each case a Pravaz syringeful was injected into the subcutaneous and muscular tissue of the left shoulder. On the second and third days there was already noticed a soft but tender

swelling in the muscle and the subcutaneous tissue of the left shoulder; this swelling increased from day to day, and reached its maximum about the end of the week; then it gradually became smaller but firm. The temperature of both animals was raised on the second and third day, on which days they left off feeding, but after this became apparently normal. Both animals exhibited a slight cough, beginning with the eighth to tenth day, and this gradually increased. One animal left off feeding and ruminating on the twelfth day, 'fell in' considerably, and died in the night from the fourteenth to fifteenth day; the other animal on the twenty-third to twenty-fourth left off taking food, 'fell in' very much, and was very ill; it was killed on the twenty-fifth day.

"In both animals, beginning with the fifth day, there appeared on the skin of the udder, less on the teats, red raised papules, which in a day changed to vesicles, surrounded by a rim of injected skin; the contents of the vesicles was a clear lymph, the skin underneath was much indurated and felt like a module; next day the contents of the vesicles had become purulent, *i. e.*, the vesicle had changed into a pustule; in another day the pustule dried into a brownish-black crust, with a sore underneath; this crust became thicker and larger for a couple of days, then became loose and soon fell off, a dry healing sore remaining underneath. The whole period of the eruption of papules leading to vesicles, then to pustules, and then to black crusts which, when falling off, left a healing dry sore behind, occupied five to seven days. The eruption did not appear in one crop; new papules and vesicles came up on the udder of one cow almost daily between the fifth and eleventh day after inoculation, in the other cow between the sixth and tenth day; the total number of vesicles in the former cow amounted to about twenty-four on the udder, four on the teats; in the latter they were all on the udder and amounted to eight in all. The size of the vesicles and pustules differed; some were not more than one eighth of an inch, others larger, up to $\frac{1}{2}$–$\frac{3}{4}$ of an inch in diameter; they had all a rounded outline, some showed a dark centre. From one of the above cows on the fifth day milk was received from a healthy teat, having previously thoroughly disinfected the outside of the teat and the milker's

hand; from this milk cultivations were made, and it was found that thirty-two colonies of the diphtheria bacillus without any contamination were obtained from one cubic centimetre of the milk."

Examples are given by careful observers of the importation of diphtheria by turkeys and also by pigeons. It is probable that diphtheria may occur in all domesticated animals.

Regarding the question of the differential diagnosis of tonsilitis and diphtheria.

I think that it is frequently impossible to decide definitely for the first two or three days of the illness, between the two diseases. Again a case when first seen may present all the typical attacks of tonsilitis, but in a day or two the diphtheritic membrane may become manifest. These obscure cases occur so frequently in practice that I have come to look upon all cases of sore throat with grave suspicion. As illustrating this point the history of a slight outbreak of diphtheria in an institution in a neighboring State may not be amiss.

A patient was admitted ill with a supposed case of tonsilitis, and in a short time four or five persons, who had been in intimate relation with the first, were taken ill with diphtheria. The drainage and hygienic conditions of the building were examined and found to be satisfactory. After the recovery of the patients the premises were very carefully disinfected. In about six months a second patient with a slight sore throat was admitted, and there was again an outbreak of diphtheria in this institution.

A few years ago at one of the summer hotels in this State, where particular attention had been paid to drainage and to all the details of hygiene, there was an outbreak of diphtheria, which could be traced, without much doubt, to a mild attack of so-called tonsilitis.

In Dr. Abbott's valuable paper on diphtheria in Massachusetts the significant statement is made that the chief characteristics of the four towns in which there were no deaths from diphtheria were their inaccessibility. None of them were near a railway line. One is separated from the State by a high range of hills; another is an island.

When there are so many avenues for direct infection from

human beings and from the domestic animals ill with the disease, it seems much more reasonable to consider contagion as the cause rather than imperfect drainage.

Mr. Coffey stated in his paper that no attempt was made to disinfect the school books. I think that this is a matter that requires the careful attention of every member of a board of health. That contaminated books are active agents for spreading the disease must be admitted by all. How we can render these books harmless I am unable to say.

The importance of recognizing the fact that membranous croup and diphtheria are one and the same disease, and that isolation is as necessary in the one as in the other, is very great. Before reports of cases of membranous croup were required in Boston, it was of frequent occurrence that a death from croup, so called, would be followed by an outbreak of diphtheria in the same family.

A great deal has been said, of late, about the increase in the number of cases of diphtheria in Massachusetts. Regarding the increase in the State at large I am unable to speak, but in Suffolk County for the 30 years previous to 1857 the ratio of deaths from croup, putrid sore throat, and epidemic sore throat, to the living, was as great as that from croup and diphtheria for the past thirty years. The terms "putrid sore throat" and "epidemic sore throat" do not appear in the registration reports for the last thirty years. The fact is, diphtheria was even more prevalent forty years ago than now, but it was not recognized as a distinct disease, and, therefore, does not appear on the registration report of that time as a cause of death.

The fact, as the experiments of Klebs and Lœffler prove, that the sound mucous membrane will not absorb the diphtheritic poison, explains why diphtheria is so frequent a complication of scarlet fever and measles. I am inclined to think that mild attacks of diphtheria during the course of scarlet fever and measles are of much more frequent occurrence than we are apt to believe. The importance of isolation in diphtheria is acknowledged by all, but there is much diversity of opinion regarding the length of time that isolation should continue. It seems to me that a period of at least seven days should elapse, after all morbid appearances have disappeared from the throat,

before the patient can be considered free from the disease, and therefore no longer a source of danger to the public.

The PRESIDENT. Dr. Prince and Dr. Woodward are unfortunately not here. The whole subject is open for discussion, and it is hoped that the members of the association will discuss it freely from their particular point of view.

MR. COFFEY. I would like to have some of the physicians here relate what experience they have had as relates to the effects of soil upon this disease. I confess that my experience of nine years has led me to attach a great deal of importance to the condition of the soil and the exposure. I know of two districts in Worcester, the sanitary condition of which is very poor, one of these is in the oldest section of the city where the people are the very poorest, and the soil is sandy, a veritable sandbank, in fact. The other is on a hillside with a northwestern exposure, where the soil is of a rocky nature, and where there is good drainage. In one of those districts, although it is the poorest in the city, we have almost no diphtheria at all, — in looking back in the records since 1884 when we first began to have the cases of diphtheria reported, I do not remember any case in that district with the sandy soil. In the other I haven't any recollection of but one case. Now this district which you see on this map is one of the best we have. With the exception of that very lowest part the population is composed of the very best mechanics in the city. The houses are all good, and cost from $3,000 to $9,000 each, some of them occupied by mechanics and some of them by business men. There is another district in the city, the very heart of the city, that is occupied by the laboring classes, the poorest working people in the city and the oldest settled portion, down through which Mill Brook, the main sewer of the city, runs, where we have scarcely any diphtheria. That is a gravelly soil, while in this district it is a wet, clayey soil; and there is another district in the southeastern part of the city with somewhat similar conditions, mechanics and a very fair class of houses, but the same natural conditions: wet, clayey soil, rather swampy. We have diphtheria there regularly. Nearly every year we have some cases: so that those things, as I say, coming to my knowledge while I have been acting as chief inspector, lead me to think that the soil has a great deal to do

with it; and in addition to that a book came into my possession lately, a book which I saw in the possession of Prof. Sedgwick, by Dr. Thorne, of England. It was on diphtheria. He attaches a great deal of importance to soil, — in fact more importance to soil than to any other single thing, I think. Did you read it, Professor?

PROF. SEDGWICK. Not from that point of view.

MR. COFFEY. Dr. McCollom's remarks, and those of Dr. Prescott, brought to my mind the fact that I forgot to say in my talk that several of these cases — I believe I did allude to one of them as having been in school several days with a sore throat. Now, there were three or four of those cases that were not reported until the day that death occurred. The patient had been attending school for several days with symptoms of sore throat, the family regarding it as an ordinary sore throat. I have in mind a girl of 15 years of age that was in school up to within two or three days of her death, and was kept from school only to help her mother do the washing. She had been troubled with sore throat for some time. None of these gentlemen who discussed the subject alluded to this question of soil, and, as I say, my attention has been attracted to it by my experience in Worcester, which has led me to believe that certainly in Worcester it seems to have some effect, and I did not know but that the large experience that Dr. McCollom has in Boston might have given him some information on these matters that would be of interest. I would like to inquire how many cases of diphtheria you have in the Back Bay district. Is it very prevalent in that district?

DR. MCCOLLOM. In reply to Mr. Coffey's question I would say that the ratio of cases of diphtheria to the thousand of population is not much higher in the poorer parts of the city than it is in the better. For instance, the ratio for 1891, in ward 11, was one to the thousand as compared with that of ward 6, which was two. It must be borne in mind that ward 11 has an average population of 51 to the acre; that the houses have the modern sanitary appliances; and that the majority of the residents are out of town during the summer months, while in ward 6, with an average population of 90 to the acre, the houses are old and filthy, the sanitary appliances are de-

fective, and the residents remain in the city during the entire year.

Although a clayey soil, damp houses, filthy cellars, and defective drainage may have an indirect influence on the prevalence of diphtheria by rendering people living in such houses more susceptible to contagion, I think that we must look on personal infection as the most potent factor in the spread of the disease. The point that I wish to establish is this, that we must not consider that when the sanitary conditions of the dwellings have been improved that we have done our whole duty, but that the most important part of the work of stamping out the disease is to reduce all chances of contagion to the minimum. As bearing on this point it is of interest to note that in ward 1, East Boston, which is situated on a hill, there is much more diphtheria than in ward 2, situated on the flats, the sanitary condition of which is far from satisfactory.

The book of which Mr. Coffey speaks is an extremely valuable one. Notwithstanding, however, the arguments advanced in it, my experience in investigating the cases of diphtheria in Boston for the past few years teaches me that we must look to contagion and not to imperfect drainage for the cause of the spread of the disease.

In point of fact only about fifty per cent of the houses, in which diphtheria occurs in Boston, have defective drainage.

MR. COFFEY. I want to say one word more, Mr. President. I do not wish to be understood as having said or believing that wet soil causes diphtheria nor understanding Dr. Thorne to say so. I do not believe the soil causes diphtheria. There must be the germ there to cause diphtheria. What I do believe, or what I have been inclined to believe, is that in this wet soil the germ was probably more prolific, that it would cultivate the diphtheritic germ in larger quantities, and that this living in a particular district where those conditions prevail would by reason of this dampness render the people more susceptible to take the disease. That is the meaning which I think Dr. Thorne intended to convey, and that is what my own experience leads me to think.

I agree fully with Dr. Abbott about these dry systems for public school buildings. I do not believe in them. I believe the

perfect system of sewer disposal is the water system, where you have sewers, and in this case we would not approve of this school being opened until they had connected it directly with the sewer; and under the seats in that school they suspended a latrine leading directly to the sewer, thoroughly calked and made tight, with a filling tank containing fifteen gallons of water, worked automatically, and which can be regulated to be operated fast or slow; and this fifteen gallons can be sent to the sewer, and the matter carried away directly to the sewer. That was erected directly in that vault, and around and about it is open for inspection; you can get in and around it and see every portion of it; the janitor can get in there and wash the entire vault out if by any chance any matter should get spilled over the side. I think now with the system of drainage and the system of ventilation we have pretty near a perfect system, although I think the best system is where the closets are in an annex not connected with the schoolroom except by a covered passageway open at the sides.

The fact that in Worcester the most of the cases of diphtheria are in districts where the sanitary conditions are good, is a point that will bear investigation; for it is a fact that where the houses are provided with fair sanitary appliances, we have this condition of things, whereas, in the case of other houses, many of them are found to have defective drains, and yet we do not have any reports of diphtheria from that section. I want to refer to this book of Dr. Thorne's. After going over this subject and investigating a number of epidemics in England, Scotland, and Wales, he has come to the conclusion that the soil has a great deal to do with it; and he cites a number of medical gentlemen who have investigated the subject, some of whom question whether the soil itself has so much to do with it, but say that it may be due to the rise and fall of the ground water in the soil; and one authority whom he quotes is of the opinion that perhaps the diphtheritic germ is in the soil, and the rise of the water forces that out into the air, and, of course, incidentally, the people who are living in the vicinity of the wet soil, being subjected to this, are rendered more susceptible. Of course their bodily energies are lowered, and therefore they are in a condition more easily to contract disease; and I am cer-

tain, after my experience, that the soil, or the rise and fall of the ground water in the soil, has a good deal to do with it. And he said, too, that some instances had been cited where epidemics have occurred where the surface soil was gravel or sand. He said that might be true, but underneath that surface of gravel was a hard clay which rendered that really a cistern, and that the water did not get a chance to leach off or run away. I think it is a book that might be read with a great deal of advantage by health officers.

MR. COFFEY. I would like to ask Dr. Durgin if he would consider that defective drains had an effect upon the health of the family? For instance, physicians come to me and say they would like to have a certain house investigated, that they have been having repeated cases of sore throat, — not diphtheria, but sore throat; they have had them this year and last year and year before that, and they ask us to examine the drainage of those houses and see if there is not something wrong; they say the cases do not seem to yield to treatment, and that the general health of the people is running down, and we send an inspector to such a house and usually find it in a defective condition.

DR. DURGIN. I think that it is a very common experience in our cities for physicians to find repeated attacks of sore throat, which do not mend by treatment, and the board of health is asked to examine the house, and it is a common experience to find the drain defective. I think it is accepted in the profession that there is a suspicious connection between broken drains and sore throats. It is well recognized that where there is an irritated throat the diphtheritic poison takes effect much quicker. A sore throat is more likely to be attacked by diphtheria than a healthy throat. A case occurs to me which I saw a few weeks ago in a child ten years old. I saw it on Sunday evening and Monday morning. On Sunday evening it had a temperature of 103, with a pulse of 120, and appeared quite sick with a simple tonsilitis. I saw it the next forenoon and the temperature had dropped to normal and the pulse to 84; the throat had changed so much and the child appearing so well I told the family I would not see it again unless something new appeared. The child continued to improve for five days and

was quite well, when the child again became ill and they sent for me, and I then found a plain case of diphtheria.

It seems to me that such cases are not uncommon and rather indicate that the sore throat presents the most favorable condition for the lodgement of the diphtheritic poison.

DR. PRESCOTT. I was for nearly three years in the admitting office of the Boston City Hospital, and in that position I saw a great many cases of membranous croup which were sent in there for operation. I never saw one in which there was not membrane, either in the larynx or below the larynx, which was found at the time of operation, and it does not seem to me possible that there can be any case of membranous croup which is not identical with diphtheria, although there may be cases of diphtheria which are not dependent upon Klebs-Lœffler bacillus.

DR. ABBOTT. Perhaps we should come to a better understanding in this whole matter, if we make a sharper distinction between causes and conditions. If, for example, you put a half-dozen children of different ages, some of them quite young, into a small tenement of one or two rooms, together with their parents, and in these rooms they eat, drink, sleep, and cook their food, and are born there and die there, we are more likely to find diphtheria spreading under such conditions, than in a large and roomy house in which the occupants are few in number. We are apt to say that overcrowding and damp cellars are causes of diphtheria; I do not think so, they are merely conditions. If the father of a large family comes into his little home from a crowded horse-car where he has been exposed to infection, and sits in a small room among his children, he is far more likely to spread infection than he would be in a larger house with better conditions. These conditions are no more causes of diphtheria than is the soil in which a tree grows the cause of the tree. The real cause of the tree is the seed. If you furnish the seed with light, air, heat, and moisture it will grow and become a tree. The same is true of the germs of diphtheria, if you furnish them with the proper conditions they will flourish.

One thing attracted my attention in connection with the schoolhouse at Worcester, which also applies to many of these new systems of ventilating public buildings, and that is, the liabil-

ity of spreading a considerable amount of noxious and infectious material throughout the neighborhood. Here were 500 children whose excreta was deposited in one place in the basement of the schoolhouse. The fecal matter is dried by a current of air, at not a very high temperature, and a portion of it must necessarily be distributed out-of-doors. It is not disinfected; it is simply dried. The germs of disease are not necessarily destroyed by drying; some are thus affected more than others. If this is simply a possible danger, it is worth while to make it a matter of further investigation. Where a schoolhouse is located in a city having a good system of sewers, there is no excuse for having it disconnected from the sewerage system.

The sewer was intended to receive excreta, let it go there.

It seems to me that the best method of treating books which have been in an infected house is to burn them. The books are not worth much; the life of a child is of more consequence than the books, and the same is true of many of the books in the public libraries. Books that are old and of little value may be destroyed. In actual practice I have treated some books which were too valuable to destroy, by baking them in an oven heated to a temperature of not over 300 degrees Fahr., spreading the leaves in such a manner as to allow the heat to reach all parts of the book. Special care would be necessary in the case of books with rich bindings.

The PRESIDENT. The next subject is "Dairies and Cow Stables." Dr. Durgin will read something:

DR. DURGIN. I will read a text for the next topic for discussion, in the form of a regulation recently adopted by the Boston Board of Health, adding merely that the danger to which our milk supply is exposed by the careless methods of production and handling, seems to us to call for immediate and practical work. The regulation is as follows: —

"Whereas, cows' milk is one of the most common and necessary articles of food, and is oftentimes seriously impaired in usefulness and rendered dangerous to health by the want of proper care in its production or subsequent treatment or handling, it is, therefore, ordered that the following regulations be and are hereby adopted: —

"*Section* 1. — No person shall use any building as a stable for cows, unless it contains at least 1,000 cubic feet of space for each animal, is well lighted and ventilated, has tight roof and floors, good drainage, a supply of pure water and all other necessary means for maintaining the health and good condition of the cows, and has been approved by the board of health.

"*Section* 2. — Every person using any such building shall keep the same and the premises connected therewith, and all land used for the pasturage of the cows, clean and free from filth.

"*Section* 3. — Every person keeping a milch cow shall permit it to be examined from time to time as to its freedom from disease by a veterinarian designated by the board of health.

"*Section* 4. — No person having an infectious disease, or having recently been in contact with any such person, shall milk cows or handle cans, measures, or other vessels used for milk intended for sale, or in any way take part or assist in handling milk intended for sale until all danger of communicating such disease to other persons shall have passed.

"*Section* 5. — No person shall sell or use for human food the milk of a diseased cow, or permit such milk to be mixed with other milk; nor, until it has been boiled, sell or use such milk, or any mixture of such milk for food, for swine, or other animals."

The PRESIDENT. — Dr. Peters, we shall be glad to hear from you.

REMARKS OF DR. AUSTIN PETERS.

Mr. Chairman and Gentlemen: — I was unaware until a day or two ago that I was expected to make any remarks upon this subject, when I received a notice to the effect that "Dairies and Cow Stables" would be discussed by Drs. Austin Peters and Alexander Burr. Since then I have been very busy and have thought that I would not even have time to be here to-day, and consequently have not prepared anything to say, so I shall have to ask your indulgence if I confine myself simply to a few facts that I know.

I know that cows have tuberculosis; I know that a cow with

general tuberculosis and a healthy udder, or that a cow with a tuberculous udder, may give the bacillus of tuberculosis in her milk ; I know that giving that milk to man or beast for food will produce the disease in them to the extent of forty or fifty per cent, or at least it will in calves and pigs, so I do not see why it will not in mankind. The bacilli can be demonstrated to be present in the milk by means of a microscope in many cases, and in other instances it may be present, but in such small numbers as to escape detection by a microscopic investigation. I also know that in the outskirts of our large cities, particularly in the eastern part of the State, there is among dairy cows a considerable amount of tuberculosis. I am only sorry that the new regulation of the Boston Board of Health does not apply to a larger area than that contained in the limits of the city, as while there are a number of cows kept within the city limits, yet the bulk of the milk supply comes from the adjoining country. In considering the prevention of tuberculosis among humans, forbidding the sale of milk from tuberculous cows in an uncooked state is only stopping up one small loophole, and there are other steps that might be taken in the future towards checking its ravages, either by means of statute or by popular education, such as not allowing healthy and tuberculous people to sleep together, also preventing tuberculous persons from expectorating in the streets, cars, and public places as they do, the bacilli which they cough up drying and forming part of the dust of the air blowing about and infecting others. There should also be regulations requiring the disinfection of rooms or tenements, which have been occupied by consumptives before allowing healthy individuals to occupy them. I doubt if the milk from tuberculous cows causes more than five per cent of the human tuberculosis, but that the majority acquire tuberculosis from other people rather than from animals. Only a careful system of meat and dairy inspection carried on for several years, comparing the vital statistics under the new and old régimes, can show just how important the danger from animal infection is. Still I think the animal is a source of danger, and that it is taking a step in the right direction to attempt to destroy this source.

The old Society for Promoting Agriculture, for which I at

one time had the pleasure of working, had an experiment farm for a couple of years at Mattapan, in Dorchester. I had charge of the farm, and also assisted with the microscopic work which was carried on in charge of Dr. Ernst at the bacteriological laboratory of the Harvard Medical School. At the farm there were always kept ten or a dozen tuberculous cows, and as soon as we got through with one cow I never had any trouble in finding another diseased one to take her place. Twenty-five or thirty cows were used in the experiments, which were carefully conducted. The pigs and calves were kept in a separate building from the cows, with quite an open space between, and the milk was carried to them. Each calf had its individual pail, which was scalded daily, and each had the milk from a certain cow. The pigs received the surplus milk from any number of cows, which was not required by the calves. The calves and pigs used for feeding experiments were, as a rule, killed when about six months old, and careful post-mortems made upon them. In most of the cases where tuberculosis existed in these animals the liver was the seat of the disease. In one instance a nodule was found in one of the kidneys of a calf, the other organs being apparently healthy, showing that the germ had almost escaped from the system through one of the ureters before it was caught.

In the consideration of a pure and healthful milk supply there are other diseases to be guarded against beside tuberculosis. Milk is a pretty good culture medium for various germs, and it may be a vehicle for conveying typhoid fever, cholera infantum, and similar maladies; therefore it is a very important matter to insure a proper milk supply, well worthy the consideration of every board of health, and to do it properly it seems to me that more can be done by means of State than by local legislation.

Dr. Alexander Burr. This subject of the inspection of milk farms seems to me to be a very important one. The danger from glanders, tuberculosis, or any other chronic contagious disease is going to increase rather than diminish, under the present condition; to receive anything like a healthy supply of milk for our tables it has got to be collected where there is the least possible source of contamination; for, allowing a few

germs to get in at the start, by the time we get it at our tables they have reproduced their kind away up into the millions; thus it seems to me that the stable is the first place where the greatest care should be taken, and to do this we have got to carry out the strictest sanitary and hygienic laws, not only in regard to the health of the individual animal, but in regard to the surroundings, the feeding of the animals, and the manner of milking them as well.

It does not follow because cows are not the victims of some contagious disease, that the milk coming from those cows is free from germs and suitable for food.

The non-pathogenic germs we care nothing about; we are constantly inhaling them, and introducing them into our system in milk, water, and other articles of food. It is the pathogenic germs which we must fear and guard against.

Tuberculosis is the one of all diseases that is creating the greatest interest, and in passing I want to say that I do not think that tuberculosis exists in Massachusetts to any greater per cent than in other States, in proportion to its population; neither do I think it exists to such an alarming extent as some of our veterinarians would have us believe, but that it does exist in the neighborhood of large cities, there is no doubt, and now is the time to fight it. There can be no doubt but that the tubercle bacillus is present in the milk from an animal with lesions in the mammary gland, and experiments have shown that it may be present where there were no lesions of the gland; and even if we should regard the milk coming from these last animals as being harmless, there still remains the dangers of infection of it from the outside, and this seems to me to be a very fertile source of danger, if we consider how easily, under the ordinary methods of milking and handling, anything in the air might drop into the milk pail.

Although glanders is not a bovine disease as far as we yet know, still how common it is to find a horse in an advanced stage of glanders in the same stable where milch cows are kept, and under these conditions is it not plausible to believe that the bacterium causing glanders might drop into the milk during the process of milking?

Tuberculous animals being present in a stable it follows

that the tubercle bacilli are being constantly thrown into the air of the stable. It is stated that cows do not expectorate, but to say that they do not cough up anything would not be correct, and even were it so, the expired air must contain the bacilli. The bacilli which escape in the human excrement go to places where they can do no harm; not so in the case of that from animals; that falls to the stable floor, is later thrown outside in a pile, and it finally contaminates the air of the stable. Thus it will be seen that milk coming from stables where contagious diseases are present, even though it does not contain the bacilli of any special disease when it leaves the mammary gland, may become infected from their presence in the air; and without going any further it is safe to say that the contagion of all contagious diseases is all over the stable where animals suffering from such diseases are kept, and hence the ready source for contaminating otherwise pure milk. And this brings me to the question of how long the bacilli will live. Sunlight and cold are detrimental to their growth, but they simply retard the growth, and are very slow; experiments have shown that tubercle bacilli may retain their virulent properties in sputum, which has been in a state of dryness for three years.

At one of the public institutions at Washington, I have been informed that they find considerable difficulty in keeping their herd of milch cows free from tuberculosis, and the officers of that institution account for it from the fact that these animals graze on the same grounds where human tuberculous patients roam, the bacilli retaining their virulence even though in a dry state.

Thus it seems to me if we expect to receive anything like a healthy supply of milk, our milk farms have got to receive a thorough inspection annually, semi-annually, or quarterly for all contagious diseases.

MR. SMITH. I would like to ask Dr. Durgin whether the Boston Board of Health has considered the question as to how far the boards of health can go in controlling the milk supply. I have heard the question asked by persons here in this room, among whom there has been some little discussion about the action taken by the Boston Board of Health, and whether boards of

health generally throughout the State would feel warranted in taking similar action. It is not a matter which I have considered at all, but I think there is some doubt, perhaps partly from a legal point of view, in the minds of those who have thought about the matter, whether boards of health generally would be warranted in passing rules as strong and vigorous as those which have been read here by Dr. Durgin.

DR. DURGIN. The statute law reads that boards of health shall make such regulations as they deem necessary for the protection of the public health. We consulted our law department before passing this regulation, and were told that it was right.

PROF. SEDGWICK. I think the point just made by Dr. Durgin is the very point that should have the most weight at present. He has said, I think, that in these matters it is as much a question of decency as of danger. I believe, however, that the feeding to young children or adults the partially decomposed food, even supposing it not to contain the germs of tuberculosis or typhoid fever, is ample warrant for the care which the board of health proposes to exercise over the milk supply; and with regard to the question raised by one gentleman, I will say further that it seems to me that it is the duty of the boards of health to lead the public as far as they possibly can in these matters. I know that it is not always politic, but I know that the American people like to be led when their leaders are competent, and I think that if the boards of health would amply explain the ground for their action, as the Boston Board of Health does in the preamble to these regulations, they would have no difficulty in finding a following. The whole point of the milk story is this: Milk is one of the most common articles of food; it is given especially to the young, and very largely to children under five years of age. It is usually drawn from the animals in stables which will not bear description in good society, from cows which often have flaking excrement all over their flanks, by milkmen who are anything but clean. It is drawn into milk pails which are seldom or never *thoroughly* cleaned, sent to the city over long journeys by rail, and at last arrives in the city, where it is still further delayed, and finally delivered to the consumer in a partially decomposed condition.

Children need normal milk. They do not get it from milkmen. As a rule, the milk is at least thirty-six hours old when it is delivered in Boston, and it is partially decomposed, — so far, indeed, that it is usually acid, whereas normal milk is not so. When you add to these facts the other fact that should be insisted upon, that it may contain the germs of disease, you have a story which any fair-minded citizen, it seems to me, must regard as deplorable. The wonder is that we have stood the thing as long as we have, and the wonder is that so many of us have survived as we have. But people will say, "I drink milk, I have drunk it from childhood, my grandfather drank it and lived to a good old age," and will argue that, therefore, there is no danger in it; but just bear in mind the numbers of people that have not survived; remember that we are only the picked few, after all, that have been able to stand this and a thousand other things; remember that if we, the picked few, are to be taken as the illustration of those who have been exposed to the dangers of the milk supply, it is exactly like taking the members of the Grand Army when they are out on parade and feeling of their muscles, and then saying, "Well, war is not such a bad thing after all; these men seem to be a pretty healthy lot; they are living to a good old age." It is exactly the same kind of logic.

So there are many sides to this question; but I repeat what I said before, that I am proud that the Boston Board of Health has had the courage to take the bit in its teeth and attack the large amount of filth in milk which is a source of great danger. I do not think that we need go beyond the statement that with this, and with the possibility of typhoid and scarlet fever germs, the whole makes up a question that must be faced until people shall realize that it will not do to pay several dollars a bottle for champagne for themselves, and a few cents a quart for dirty and perhaps dangerous milk for their babies.

The trouble begins in the stable; it grows in the transportation, and culminates after delivery, and I am glad to see that the subject is to be taken hold of as it should be by the Boston Board of Health.

Mr. Smith. I think that the boards of health everywhere will have a great deal of sympathy with the Boston Board of

Health in its efforts to purify and make safe the milk supply in Boston; but as a former speaker suggested, the remedy is very inadequate, if protective measures are confined to Boston. The largest part of the milk used by the citizens of Boston and of adjacent cities is produced on the farms back in the country, and there should be co-operation between all the boards of health in this part of the State in order to produce anything like a substantial result.

Now, if we eliminate from our discussion the prevention of tuberculosis, and consider merely the matter of cleanliness and the prevention of filth in milking the cows and taking the product to the market, it seems to me that we still have to deal with a very large and difficult question. No doubt the boards of health can do something to improve cow stables, to secure better ventilation and more cleanliness, — they can do something; but from what I have seen myself (and I was brought up on a farm, as probably a large number present were), I know that a large part of the filth which gets into the milk gets there in ways beyond the direct control of boards of health, for it gets in there by the careless behavior of the milkman. By the milkman I mean the man who milks the cow. (I don't know what the milkman who sells the milk does with it; only the milk inspectors know that.) The day has gone by when a pretty milkmaid went in clean white apron and with shining milk pail to milk the cow with the crumpled horn out among the buttercups of a dewy morning. Instead, some old fellow stumbles out of the house and to the barn, with the stump of a clay pipe in his mouth and wearing overalls and boots saturated and covered with the filth acquired by a winter's use. When he reaches the barn, he selects some recumbent cow, kicks her until she stands up, dripping and slimy, and, as he is a little late and the milk will have hardly time to cool before the man who carries it to the city will come along, he does not stop to clean up behind the cow, but sitting down on a stool, proceeds to gather the milk and whatever else may fall into a pail which perhaps is clean and perhaps is not. Of such refinements as washing the udder of the cow or wiping her flanks, he has never heard. If he has, it is only to scoff.

Then he strains the milk behind the cows. That is bad

enough, but it is not all the story. Every one knows that in straining the milk the strained becomes obstructed more or less with dirt and filth, and when the milk does not run fast enough he would be a rare milkman who hesitated to scrape away a place with his fingers, so that the milk may run more freely. Those who have seen certain fingers, as I have, know what that means.

If the people of Boston only knew how much filth they drink in their milk they would be frightened. I know one family who were pretty well alarmed by the discovery of a peculiar flavor in their milk; they could not make out what it was until finally, thinking the milk tasted a little like tobacco, they found out that the man who milked smoked a pipe while milking, and when the cow kicked or switched its tail to brush off a fly or something of that sort, his pipe frequently was upset and its contents knocked into the milk pail.

Now, while I say that we ought to approach this matter in all seriousness, and while we ought to remove every chance for contagious disease, to try to get better stables and better ventilation, and to make all the conditions clean and wholesome, I say that it is impossible to improve the condition of the milk that is carried in from towns about Boston unless we improve the *morals*, so to speak, of the milkman; unless every one who takes milk, every one who handles milk, the milkmen who carry it into Boston, all see to it that the milk is produced perfectly clean. Boards of health should co-operate to create a strong sentiment in this matter. The idea existing to some extent in the community that the present condition of things is harmless, must be reformed. Only then can we hope to have our milk the clean and wholesome article that it ought to be.

Mr. French. There is one thing I would like to ask Dr. Durgin, and that is, if, in drawing up those regulations, they have considered the height of the studding of the stable in which the animals are kept? It seems to me that nothing less than eight feet studding should be allowed where milch cows are kept for dairy purposes; for I have in mind stables with only six feet studding, but which, undoubtedly, provide a thousand feet of air space for each animal. In such instances, the exhalations and emanations rising from the animals and the

manure vaults must be far in excess of the quantity of pure air supply, and, upon reaching these low ceilings, are thrown down again, so that the animal has scarcely any chance at all to breathe pure air, which must, in my opinion, have the effect of breaking down the health of the animal. If I may be pardoned for referring to it, I hope that the subject of dry closets in schools, previously spoken of, may be given some attention and discussion by this association, as it is a matter which my board is investigating, and, as far as we are able to find, the dry closet is not regarded as the proper thing for introduction into our schools. I hope that this association will consider this and find it worth while to take some official stand on the question.

Dr. Durgin. I would say in answer to Mr. French's question about eight foot studding, that, in drawing up this regulation, we avoided much detail. We call, however, for the lighting and ventilation to be satisfactory to the Board of Health, and no stable will be approved until seen and found to be satisfactory. Eight feet in new work ought to be required, but it will be found necessary to accept compensating conditions in many of the old stables where the studding is a trifle under eight feet.

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